

REMARKS

In the Office Action dated August 22, 2005, the Examiner rejects claims 1-6 under 35 U.S.C. § 102(b) and 7-11 under 35 U.S.C. § 103(a). With this Amendment, claims 1, 7 and 9 are amended. Claims 12-14 are added, and no claims are canceled. After entry of this Amendment, claims 1-14 are pending in the Application. Reconsideration of the Examiner's rejections is respectfully requested.

With this Amendment, minor corrections are made to the specification to correct typographical or grammatical errors and to correct or add reference numbers. It is respectfully submitted that the changes noted above merely clarify the subject paragraphs and conform them to the drawing figures and to the remainder of the specification. The changes do not constitute new matter. Applicants respectfully request entry of the changes to the specification.

Applicants have also made a number of minor corrections to the drawing figures. In Figs. 1 and 3, the unnecessary bracket has been removed. In Fig. 2, the spelling of complementary has been corrected. In Fig. 4, the angle 44 has been corrected to the angle 47 and the duplicative reference number 50 and the arrow directed therefrom have been removed. In Fig. 5, the missing reference number to the emitter 40 has been added. Applicants respectfully request the Examiner's approval of the proposed drawing figures.

The Examiner rejects claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by WO 01/35077 A1. The Examiner relied upon the English Abstract in making this rejection. Applicants herewith submit a translation of the subject publication and, respectfully, traverse this rejection. In claim 1, the spelling of complementary has been corrected and certain other typographical and grammatical changes have been made. It is respectfully submitted that WO 01/35077 fails to teach or suggest the features of claim 1 and its dependent claims. A nominal illumination angle is defined as the angle of illumination, measured from a plane normal to the object in the

illustrated embodiments, which most effectively illuminates the object under consideration. (See paragraph [0021]). The publication cited by the Examiner does not determine a nominal illumination angle and does not position the light source at an angle complementary to the nominal illumination angle; it merely positions the light source at an angle T_i from a line normal to the measurement spot 14. (See Fig. 1). The publication is silent on how the angle T_i is determined because the invention is instead directed to correcting errors in the normal measurement where the detector aperture is located at the angle T_r , which is equal to the angle T_i . (See p. 3). The detector aperture at angle T_r is finely adjusted to reduce errors in alignment and create inverse bidirectional reflectance distribution functions. (See pp. 3, 12). It is respectfully submitted that claim 1 and its dependent claims 2-4 are allowable over the prior art of record.

In addition to the foregoing, it is respectfully submitted that claims 2 and 3 are allowable over the prior art of record. The Examiner states that WO 01/35077 A1 discloses that the nominal illumination angle is empirically (claim 2) or mathematically (claim 3) determined, but the publication does not describe at all the determination of a nominal illumination angle. The detector aperture is electronically or mathematically adjusted to eliminate alignment errors. (See p. 12). Based upon this reason and upon dependency from claim 1, claims 2 and 3 are allowable over the prior art of record.

The Examiner rejects claims 5 and 6 under 35 U.S.C. § 102(b) as being anticipated by Stover et al. The Examiner states that Stover et al. discloses a plurality of discrete light sources (Fig. 7, Ref. 32; col. 9, ll. 30-32) arranged in two dimensions and positioned at an angle complementary to the nominal illumination angle (See Fig. 7). It is respectfully submitted that the Examiner has misstated the teachings of Stover et al. Similar to WO 01/35077 A1, there is no teaching or suggestion in Stover et al. that a plurality of discrete light sources be positioned at an angle complementary to a nominal illumination angle. Contrary to the Examiner's contention, nothing in Fig. 7 of Stover et

al. recognizes the existence of a nominal illumination angle. Further, the Examiner is incorrect that Stover et al. teaches a plurality of discrete light sources arranged in two dimensions. Each illustrated embodiment (Figs. 7 and 8) show only one light source 32. Although the specification describes the possibility of as many as three light sources 32 arranged in a mount 106, there is no teaching or suggestion that such light sources would be arranged in two dimensions. (Col. 9, ll. 30-32). Most likely, based upon the disclosure therein, Stover et al. contemplates the arrangement of the light sources in one dimension, a line. For the foregoing reasons, the invention of claims 5 and 6 is patentable over the prior art of record.

The Examiner rejects claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Stover et al. in view of Josuh et al. The Examiner states that Stover et al. teaches all the features of the claimed invention except for the feature of LEDs mounted on the circuit board in the shape of a cone. The Examiner further states that Jusoh et al. shows that it is known to provide LEDs shaped in a cone for an illumination apparatus. The Examiner concludes that it would have been obvious to one skilled in the art at the time the invention was made to combine the device of Stover et al. with the cone shaped LEDs of Jusoh et al. for the purpose of providing uniform illumination of the inspection surface to increase the accuracy of the measurement.

Claim 7 has been amended to clarify the phrase: "a plane of the cone is positioned (*sic*) an angle complementary to the nominal angle." Claim 7 now reads that the cone is symmetrically positioned about a line perpendicular to a surface of the object. It is respectfully submitted that the proposed combination fails to teach or suggest all the features of claim 7. Initially it is noted that claim 7 depends from claim 6 and consequently includes all the features of claims 5 and 6. As noted above, Stover et al. fails to teach or suggest all the features of claims 5 and 6 so it fails to teach or suggest all the features of claim 7. The combination of Jusoh et al. with Stover et al. as proposed by the Examiner fails to cure these deficiencies because there is no motivation to make

such a combination. The Examiner states that such a combination would be motivated by a desire for uniform illumination that would increase the accuracy of the measurement. However, it is only Applicants' specification that suggests that accuracy of the measurement is improved by the illumination provided by the inventive light source. A *prima facie* case of obviousness requires the motivation for combination to come from the art; the Applicants' teachings cannot be used against them to make the invention obvious. In addition, it is respectfully submitted that Stover et al. clearly describes the prior art where the light source, single light source 32 as illustrated, provides light that hits the surface of the object being analyzed at different angles. Detectors 34 spread at a variety of angles in the same mount to pick up the reflected light. Installing LEDs mounted to a flexible PCB in the shape of a cone in Stover et al. would interfere with the detectors 34 needed to pick up the reflected light. The scanning head of Stover et al. would not work. No one skilled in the art would make a combination that results in an inoperative device. Claim 7 is allowable over the prior art of record.

The Examiner rejects claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Stover et al. in view of Cochran et al. The Examiner states that Stover et al. teaches all the features of the invention except that it does not show the LEDs are mounted on two rigid circuit boards. Cochran et al. shows this additional feature, and the Examiner states that it would have been obvious to combine the device of Stover et al. with the two LED circuit boards of Cochran et al. for the purpose of providing uniform illumination of the inspection surface to increase the accuracy of the measurement. As mentioned above, it is respectfully submitted that the Examiner cannot engage in hindsight reconstruction by using Applicants' teachings of the benefit of the inventive light source to render the invention obvious. Further, it is respectfully submitted that the Examiner's obviousness argument fails because no one skilled in the art would be motivated to make such a combination because the goal of Stover et al. is to

create interchangeable scanning heads for use in a scatterometer. The heads use one or more light sources and one or more detectors mounted in a semicircular arrangement designed to make measurements of light scatter for a wide variety of applications not previously thought to be feasible. (See Abstract). The use of two rigid circuit boards as described in claim 8 would eliminate the benefits of the semicircular arrangement of Stover et al. It is respectfully submitted that the invention of claim 8 is patentable over the prior art of record for this reason and based upon its dependence from allowable claims 5 and 6.

The Examiner rejects claims 9 and 10 under 35 U.S.C. § 102(b) as being anticipated by Stover et al. Claim 9 has been amended to move the nominal illumination angle from the preamble to the body of the claim. It is respectfully submitted that claim 9 is not anticipated by Stover et al. because Stover et al. fails to teach or suggest a device for inspecting a semiconductor device having a nontrivial bi-directional reflectance distribution function and including a sensing element and a lens arrangement where a two dimensional light source is positioned at an angle complementary to a nominal illumination angle of a semiconductor device. Stover et al. nowhere identifies a nominal illumination angle. In addition, and as mentioned with respect to claim 5, although the specification describes the possibility of as many as three light sources 32 arranged a mount 106, there is no teaching or suggestion that such light sources would be arranged in two dimensions. (Col. 9, ll. 30-32). Claim 9 and its dependent claim 10 are allowable over the prior art of record.

The Examiner rejects claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Stover et al. in view of Josuh et al. The Examiner states that Stover et al. teaches all the features of the claimed invention except for the feature of LEDs mounted on the circuit board in the shape of a cone. The Examiner further states that Jusoh et al. shows that it is known to provide LEDs shaped in a cone for an illumination apparatus. The Examiner concludes that it would have been obvious to one skilled in the

art at the time the invention was made to combine the device of Stover et al. with the cone shaped LEDs of Jusoh et al. for the purpose of providing uniform illumination of the inspection surface to increase the accuracy of the measurement.

This rejection is respectfully traversed. As explained with respect to claim 7, the only motivation to make such a combination is the Applicants' own disclosure, which is impermissible. Further, as explained in more detail above, the combination would render the scanning head of Stover et al. inoperable because a cone as proposed would interfere with the detectors 34 needed to pick up the reflected light. Claim 11 is allowable over the prior art of record for these reasons and based upon dependence from allowable claims 9 and 10.

With this Amendment, Applicants have added new claims 12-14. Claim 12 depends from claim 1 and provides the additional feature of positioning a detecting lens arrangement along a line perpendicular to a surface of the object. Claim 13 depends from claim 5 and adds the additional feature wherein the plurality of discrete light sources are positioned symmetrically about a line perpendicular to a surface of the object; and wherein a lens arrangement is located symmetrically about the line on a side of the plurality of discrete light sources opposite the surface. Claim 14 depends from claim 9 and adds the feature wherein the lens arrangement is positioned symmetrically about a line perpendicular to a surface of the semiconductor device. It is respectfully submitted that new claims 12-14 contain patentable combinations of features such that they are allowable over the prior art of record. Examination and allowance of claims 12-14 are respectfully requested.

It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's objections and rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of

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the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the Applicants' attorney at the telephone number listed below.

Respectfully submitted,

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Amendments to the Drawings:

In Figs. 1 and 3, the unnecessary bracket has been removed.

In Fig. 2, a spelling error has been corrected.

In Fig. 4, the angle 44 has been corrected to the angle 47 and the duplicative reference number 50 and the arrow directed therefrom have been removed.

In Fig. 5, the missing reference number 40 has been added.

Attachments: Two (2) replacement drawing sheets